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INJURY PREVENTION IN THE WORKPLACE

by

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A Scholarly Project

Submitted to the Occupational Therapy Department

of the

University of North Dakota

In partial fulfillment of the requirements

for the degree of

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Approval Page

This Scholarly Project Paper, submitted by Jeremy Anderson in partial fulfillment of the requirement for the Degree of Master's of Occupational Therapy from the University of North Dakota, has been read by the Faculty Advisor under whom the work has been done and is hereby approved.

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Abstract

Ergonomic assessments and proper body mechanics are the common practice for educating post injury employees. However, injury prevention protocols are often not a routine practice although they are believed to be essential in decreasing the number of injuries on the job, and lowering related costs to the employer.

Research literature consistently identifies the negative fiscal, psychological, emotional and physical impact of occupational injuries on both society and the individual worker. Occupational injuries account for billions of dollars every year in medical and workers compensation costs not taking into account the billions in indirect costs. The issue is that despite the growing research on occupational injuries and the prevention methods, many industries still do not develop and implement prevention and intervention programs to eliminate or minimize the negative impact of these injuries.

A literature review was conducted to identify the current 'costs' to the worker and industries as well as the best practice methods for prevention and intervention of these costs. Key concepts were identified and defined throughout the literature review in the scholarly project.

The purpose of this scholarly project was to develop a protocol that is based on the primary types of workplace injuries with corresponding prevention and intervention steps identified. One aim was to demonstrate the correlation that injury prevention can have on productivity. If the frequency and number of injuries decreases, productivity is expected to increase.

Occupational Therapy holds the essential skills necessary for developing, and implementing an injury prevention program. With a strong background that combines both the biomechanical and behavioral components of human occupation with performance, Occupational Therapists are essential in designing, implementing and evaluating interventions to address the human and environmental factors that contribute to occupational injury.

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CHAPTER ONE

INTRODUCTION

Ergonomic assessments and proper body mechanics are the common practice for educating post injury employees. However, injury prevention protocols are often not a routine practice although they are believed to be essential in decreasing the number of injuries on the job, and lowering related costs to the employer.

There is a growing body of research literature that consistently identifies the negative fiscal, psychological, emotional and physical impact of occupational injuries on both society and the individual worker. Occupational injuries account for billions of dollars every year in medical and workers compensation costs but this is not taking into account the billions in indirect costs. The issue is that despite the growing research on occupational injuries and the prevention methods, many industries still do not develop and implement prevention and intervention programs to eliminate or minimize the negative impact of these injuries.

A literature review was conducted to identify the current ‘costs’ to the worker and industries as well as the best practice methods for prevention and intervention of these costs. Key concepts are identified and defined throughout the literature review in the scholarly project.

The purpose of this scholarly project was to develop a protocol that is based on the primary types of workplace injuries with corresponding prevention and intervention steps identified.

Chapter II will present the literature regarding occupational injuries defined by type, associated costs, and potential savings associated with implantation of an injury prevention program. Key concepts are identified and defined throughout the literature review. Chapter III will provide a methodology used to conduct the literature review. Chapter IV will be a protocol to be used for development of an injury prevention program. Chapter V is a summary with conclusions, limitations, clinical implications, recommendations for further action, development and research.

CHAPTER TWO

REVIEW OF LITERATURE

“Historically, injuries have been considered to be “accidents”, the result of random, uncontrollable factors that are beyond human control” (Arbesman, Campbell & Rhyners, 2001, p E99). The number of injuries and illnesses in private industry requiring days away from work in 2002, totaled more than 1.4 million (U.S. Department of Labor, 2004, p1). Statistical characteristics of workplace injury and illness can be used to identify potential risks. In reality, the majority of these are not accidents but the results of risk factors and hazards that were not identified and removed. Identifying, preventing or eliminating potential risk factors is essential to decreasing injuries in the workplace. Potential risks are used in conjunction with the tools of industrial therapy to further define how to educate, implement environmental modifications (ergonomics), and enforce injury prevention as a viable program to employees.

Injury prevention is a primary tool for decreasing the number of occupational injuries. The benefit/cost savings proves the worth of such a program to employers that are concerned with reducing production costs, and retaining skilled employees. Statistics continue to support the need for injury prevention, while the knowledge of injury characteristics can help to address specific types of injuries that are common in the workplace.

One aim of this study was to demonstrate the correlation that injury prevention can have on productivity. If the frequency and number of injuries decreases, productivity is expected to increase. This can be measured by identifying; 1) the amount of increased hours worked, 2) cost savings, an essential measure necessary to sell an injury prevention program, and 3) a decrease in overhead operating costs. Of the three measures, workers compensation costs, both direct and indirect, can give employers the best overview of the effectiveness an injury prevention program may have. Due to the high cost associated with workers compensation, it continues to remain a large consumer of operating costs, and when this expenditure can be directly addressed with reductions, savings are a good measure of how injury prevention is effective.

As stated earlier, the steps in the process begin with looking at the organization in a variety of ways to get the whole picture. The first step is to understand the general workplace injury statistics.

Work Place Injury Statistics

General Demographics

Demographics are used to identify population characteristics contributing to potential risk for occupational injuries. The U.S. Department of Labor currently collects data on gender, age, and length of employment to identify traits and patterns of occupational injury that may be used to develop a prevention program based on risk potential.

In 2002, the U.S. Department of Labor (p. 4) reported that:

- 65 percent of the total cases involving lost work time due to injuries involved males.

- Employees aged 20 to 44 accounted for 64 percent of all injuries.
- Operators, fabricators, and laborers experienced 552,900 injuries, the most out of all occupational groups with 36 percent occurring in manufacturing.

Employees with one to five years of service accounted for 37 percent of the total cases, while those with more than 5 years of service made up 29 percent.

Musculoskeletal disorders accounted for 34% (487,900) of the total injuries and illnesses reported in 2002.

The U.S. Department of Labor defines a musculoskeletal disorder (MSD) as an injury or disorder of the muscles, nerves, tendons, joints, cartilage, and spinal discs. MSDs do not include disorders caused by slips, trips, falls, motor vehicle accidents, or similar accidents. (U.S. Department of Labor, 2004, p. 5)

In addition to the general demographic information, it is important to consider the injury characteristics of the workplace. Injury characteristics not only indicate the risk of injury for instance in a job analysis, they also serve to identify future risk potential in completing an employee job assessment.

Injury Characteristics of the Workplace

Specific injury characteristics are identified using four case characteristics; 1) nature, 2) part of the body affected, 3) event or exposure, and 4) source of the injury or illness. In 2002, the U.S. Department of Labor (2004, p. 5) identified the following injury characteristics:

- Sprains and strains accounted for 43 percent of all cases.
- The trunk was most often affected, accounting for 36 percent of the total cases.

- Overexertion and contact with objects and equipment accounted for more than half of all cases.

Floors, walkways, and ground surfaces; worker motion or position; containers; and parts and materials accounted for 57 percent of the total cases.

The largest area of concern in regard to occupational injuries, are those that fall into the category of Musculoskeletal Disorders (MSDs). This is due in part to the costs associated with the treatment, and accommodations that are required to return those affected by MSDs to work

Musculoskeletal Disorder Statistics

MSDs are responsible for billions of dollars yearly in employer, employee, and society costs. “According to the Occupational Safety and Health Administration (OSHA) Office of Ergonomic Support, MSDs are responsible for 33% to 40% of workers’ compensation claims” (Melhorn, Wilkinson, Gardner, Horst & Silkey, 1999, p. 834). Addressing prevention of MSDs, directly, can have a profound cost savings for the employer, not to mention the effects that are avoided post injury for the employee physically and psychosocially.

MSDs “result in direct or indirect physical and mental disability. Secondary effects such as muscle contractures or atrophy, limitations in joint mobility, deformity in alignment, weakness, sensory dysfunction, and chronic pain can occur” (Neistadt & Crepeaul, 1998, p. 683). The etiology of an MSD is commonly attributed to overexerted lifting, repetitive motions, and exposure to harmful environments. When compounded with poor positioning, or awkward motions, the risks increase with the frequency and duration the worker is exposed to this potential occupational injury risk.

The injury characteristics of MSDs as identified by the U.S. Department of Labor, (2004, p 5-6) are as follows:

- Sprains and strains accounted for 76 percent of the all MSD cases.
- The trunk accounted for 71 percent of all cases.
- Seventy five percent of all MSD cases were due to overexertion.
- Worker motion or position was responsible in MSD cases for 57 percent of the reported cases.
- MSDs made up 34% (487,915) of the total number of injuries in 2002 (U.S. Department of Labor, 2004, p. 2).

Musculoskeletal Disorder Demographic Characteristics

MSD demographic characteristics are important because they define employee needs and highlight the need for injury prevention based on gender, age, occupation, and years of service. As these characteristics are defined, they are also is a good indicator for groups of employees at increased risk.

Demographics indicate employees are at risk when they fit one demographic category. It is also expected that when they fit one or more of these categories their risk increases. When considering the demographics for injuries or illnesses involving MSDs, the traits and patterns are true in comparison to the number of overall injuries and illnesses. The U.S. Department of Labor (2004, p. 1) identified the following demographic information:

- Males, again, accounted for 62 percent (300,128) of all MSD cases.
- Workers aged 20 to 44 accounted for 65 percent (316,113) of all MSD cases.

- Operators, fabricators, and laborers accounted for 39 percent (189,134) of all MSD cases. Within this occupation group, 21 percent of these cases occurred in the manufacturing industry.
- Employees with one to five years of service accounted for 38 percent of all MSD cases, while workers with more than 5 years made up 33 percent of total cases.

For many MSDs, the injury develops over a period of time without any indication overlooking indicators that any damage has taken place. MSDs of overuse, over a period of time, are often termed cumulative trauma disorders (CTDs). “The umbrella term cumulative trauma disorders, also known as repetitive strain disorders, overuse syndromes, and repetitive motion disorders, covers a number of similar conditions arising from overuse of the joints or soft tissue structures” (Williams & Westmorland, 1994, p. 411).

The etiology of CTDs are due to a number of contributing risk factors including forceful exertions, repetitive or prolonged activities, awkward postures, localized contact stresses, vibration, and cold temperatures. When two or more are present, risk factors increase for developing CTDs. The biggest contributor for the increased number of CTDs in the workplace is the demand for increased productivity. Increased productivity exposes workers to risk factors that progressively increase the likelihood of developing a CTD. CTDs may affect several parts of the body within the three primary areas of the trunk, upper extremity, lower extremity, and/or any combination of these body parts. The three primary areas of MSDs/CTDs accounted for more than 94% (465,547) of all MSD

injuries (U.S. Department of Labor, 2004, p. 2) in the workplace as one can see in the following:

- 1) injuries of the trunk 71% (343,397),
- 2) upper extremity 15% (73,707), and
- 3) lower extremities 8% (37,443).

The high occurrence of occupational injuries for the three primary areas may indicate their level of involvement in occupation within the work environment.

Addressing each area, based on their occupational exposure in relationship to the characteristics of injuries, will identify the potential for risk of injury. Injuries to these three primary areas are attributable to factors of posture, movement, and exposure.

Three Primary areas of Occupational Injuries

The three primary areas of injuries are discussed in reference to the factors that commonly contribute to them. Injury characteristics identify these factors, and highlight their contribution to the high cost of MSD injuries. Each primary injury is separate unto itself, but that does not mean more than one area of the body can be affected. The same is true for the contributing factors, more than one may be responsible. This again highlights the need for a comprehensive program that tries to address primary injuries, and all possible factors that contribute to occupational injuries. Each of these primary areas will be defined and discussed as follows:

Trunk Injuries. MSD/CTD injuries of the trunk can be attributed to posture and movement. Posture is important as it keeps all the component structures of the trunk at a mechanical advantage, therefore strain is reduced, and overexertion is avoided. Maintaining proper posture also allows the spinal column of the trunk to maintain its

natural curvature. Poor posture adds strain to all the components of the spinal column, and can have peripheral effects throughout the body. When you combine posture with movement, the concepts of good posture remain important as movement can add undo strain overexerting the component structures of the trunk. Poor posture can have compounding effects when repetitive movement or motion is added.

Another contributing factor is weight. There are limits to the amount of weight a person can physically manage. Lifting and carrying objects place the trunk at increased risk for injury, and increasing the amount of weight only amplifies the potential for injury. Lifting and carrying loads that are greater than the individuals defined capability, coupled with improper body mechanics and awkward motions develop a progressive disorder that can have effects that extend beyond the head and trunk. Impingement disorders secondary to the CTD, can have effects in all areas of the body.

CTDs of the trunk often involve components of the spinal column. Injuries to the trunk and spinal column can involve areas extending beyond the trunk. Impingement injuries of the spinal column can manifest throughout the body. Extended exposure to this type of injury can incorporate damage to those areas peripheral to the initial injury, and can be just as debilitating. Standing for extended periods of time in static positions, or in positions that don not allow the natural curvature of the spine puts undue stress on all the structures of the spinal column. Specifically, vertebrae of the spinal column, ligaments, and muscles of the spine all play a role in CTDs of the trunk. Therefore injuries of the trunk are very encompassing. Identifying the risk of injury for this area of the body should address secondary effects throughout the body.

Upper Extremity Injuries. Injuries of the upper extremity can be attributed to motion and exposure. Motion can have damaging effects that are not always immediately evident. This is often because the motion is not always unnatural. Gripping, holding, turning, and pulling may all be natural motions. However, when you repetitively engage in any of these motions, increased risk of injury becomes a probability as the motion is often accompanied by other factors that contribute to the potential for injury such as exposure which is a compounding factor. Exposure to hot or cold temperatures, vibration, increased torque, and weight are all possible contributing factors.

Injuries of the upper extremity do not typically involve posture, but it can be an area of consideration. However, posture can definitely be a contributing factor. Poor posture of the trunk and lower extremities may place extended stress on the joints of the upper extremity. Motion and exposure compound the potential risk for injury and therefore posture is an important factor but not typical for occupational performance in reference of the upper extremities.

CTDs of the upper extremity develop over a slow period of time. Precipitating indicators are often ignored, and do not draw attention until permanent damage has already occurred. Pain and soreness are often overlooked, which increases the risk of CTD due to improper mechanics, tool use, or any number of compounding factors contributing to the development of a CTD. The upper extremities also have the highest likelihood of re-injury following return to work from a CTD. This is often due to the worker compensating for a loss of function.

Lower Extremity Injuries. Injuries of the lower extremities can also be attributed to posture and movement. Proper posture of the lower extremities allows for a

mechanical advantage while lifting, and carrying. While lifting, and carrying, if proper posture of the lower extremities is followed, the lower extremity decreases the potential for injuries to the trunk. The whole process of lifting and carrying starts with a firm base of support, and that means having proper posture of the lower extremities. Repetitive motions or movements can also have the same effects they have on the upper extremities.

CTDs of the lower extremities are often associated with the same components that contribute to those of the trunk. Standing for extended periods of time in awkward positions, lifting and carrying loads that are outside the workers defined capability contribute to the development of lower extremity CTDs. As with the upper extremity and trunk, external contributors add to the risk factors compounding the potential risk for injury.

Contributing Factors of Poor Ergonomics

Poor ergonomics are believed to be the biggest contributor for increased risk of occupational injury. Increased risk for developing an MSD injury is compounded by poor ergonomic practices. Within an injury prevention program, ergonomics is also the biggest contributor for overall cost savings.

Associated Costs of Injury

The costs that are attributed with all occupational injuries continue to grow, even though the number of reported injuries declines. “The US government predicted that by the year 2000, 50% of the American workforce will have occupational injuries annually, and 50 cents of every gross national product dollar will be spent on occupational injuries” (Melhorn, et. al, 1999, p. 833). There are also indirect costs that can not be easily

measured such as hindering production, hiring, new employee orientation, pain, and suffering.

MSDs are most often responsible for the high costs associated with occupational injuries.

Musculoskeletal injuries in the workplace account for billions of dollars yearly with only a third of that directly related to medical evaluation, testing, and treatment. The remainder is consumed largely by compensation for time off work and paying a replacement worker. (Key, 1995, p. 13)

Lost days are also responsible for the high costs associated with MSDs. In 2002, the median number of days away from work for all cases was 7 with over 25 percent of them resulting in 31 or more days away from work. Carpal tunnel ranked as the number one major disabling injury with 30 days away from work. Events or exposure to repetitive motion accounted for 23 days away from work. Injuries to the wrist and shoulder accounted for the longest absences with a median of 15 days. (U.S. Department of Labor, 2004, p. 8)

Simple changes in poor ergonomics can have a profound impact on the occurrence of an occupational injury. “Of every \$3 spent on worker’s compensation, \$1 is attributed to poor ergonomics” (Gourley, 2000, p. 16). Ergonomics is a key component for decreasing the occurrence of occupational injuries, which will be discussed later in the paper.

Workers Compensation

Workers' compensation is composed of three benefits for covered workers all of which have associated costs. Benefits compensate the injured worker for loss wages, temporary or permanent functional impairment, and death. Medical benefits cover reasonable and necessary services related to the injury. Workers compensation is an unavoidable fact of doing business. Employees must be protected and ensured services if they do experience an occupational injury

For most employers, workers compensations costs continue to outgrow their own development. According to the Minnesota Department of Labor (2004, p. 5), \$1.3 billion dollars was paid in compensation insurance coverage in 2002. The biggest contributor for high costs associated with MSDs, for the employer, remains to be workers compensation premiums. "According to the Occupational Safety and Health Administration (OSHA) Office of Ergonomic Support, MSDs are responsible for 33% to 40% of workers' compensation claims" (Melhorn, et. al, 1999, p. 834).

Injury Prevention

The ultimate goal of an injury prevention program is to prevent injuries. The ultimate reward for the employer is increased productivity, and cost savings. An injury prevention program helps to reduce costs by identifying risks, preventing their reoccurrence and, when needed, to evaluate, design and implement interventions

Cost Savings

The cost of an injury prevention program is greatly outweighed by the costs incurred by companies who pay for insurance to ensure that their employees are taken care of, should they suffer an occupational injury. As stated prior, the indirect costs are

difficult to completely calculate, however, the cost savings associated with an injury prevention program offset the implementation, and can be attributed to an increase in production. Savings that are accrued can be used to enhance an injury prevention program, or even pay for premiums it seeks to avoid using. “Prevention pays for itself in decreased medical care claims, reduced injury rates, and reduced insurance premiums to the company. Prevention programs are also responsible for increased production in some industries” (Key, 1995, p. 13).

According to Melhorn et. al, (1999, p. 844) a 4 year study depicting the effectiveness of intervention found that “the average benefit-to-cost ratio was 16.5 to 1. This illustrates that for every dollar spent for prevention (MSD intervention), the employer saved 16.5 dollars per year over the 4-year period.” Melhorn et. al, (1999, p. 833) also found the, “workers’ compensation costs decreased per year were 16%, 3%, 24%, and 12%, while work hours increased 56%.” This directly demonstrated the idea that production will increase when prevention is addressed. “Employer-estimated savings in direct workers’ compensation costs per year were \$469,990, \$678,337, \$1,936,105, and \$1,999,759” (Melhorn, et. al, 1999, p. 834). This adds up to a four year estimated savings of over \$5.0 million dollars.

If one only considered the number of lost workdays, there would be plenty of reason for concern. The costs associated with not only compensating the injured worker, but replacing the employee has a compounding effect on both the cost of production, and productivity when lost work days are considered. Defining primary MSD injuries allows a prevention program to combine statistical characteristics such as injury type, and demographics to help target the direction of a prevention program. When this issue is

expanded to tie in the lost work days with the cost of MSDs, it easy to see the reason for concern. In addition, the employer loses a skilled employee in many cases as the demographics pointed out. There are costs that can be accounted for, and those that can only be estimated. Injury prevention can take much of the guess work out of associating cost with lost productivity as it becomes to difficult to place a dollar amount on subjective components.

Designing an Injury Prevention Program

Injury preventions overall impact is the overall cost reductions for a company. This is why injury prevention is emphasized by companies trying to reduce costs due to injury, and why insurance organizations step in and sell injury prevention as a viable option to reduce costs. Injury prevention reduces costs, increases productivity, and prevents injuries, everyone wins.

An injury prevention program is created using components that assure a program is comprehensive and employee specific. The components of a comprehensive Injury Prevention program are defined and discussed as follows.

Components of an Injury Prevention Program

Understanding and using Demographics: An injury prevention program utilizes demographics to determine areas of need for an injury prevention program.

Demographics are important because they indicate that an injury prevention program has been effective for a targeted population, and outline the positive outcome for third parties. Third parties could be payers (insurers), or parties in a court of law.

Demographics are those tangibles in the injury prevention program that can be utilized to make definitive decisions on the direction of intervention.

Demographics also highlight the need for a comprehensive program because not every employee will fall into the characteristics of any one program. Demographically, there are two separate classes of employees with differing levels of knowledge in regards to practices and procedures. Employee demographics direct a prevention programs development. Demographics are the only piece of the injury prevention equation that is defined. This is true for existing, and new employees. Demographics do not single out a group of employees. Rather, demographics define the level of education, environmental modification (ergonomics), and enforcement that will be included in the injury prevention program.

Education: As part of a comprehensive injury prevention program, education is an essential tool for informing employees on prevention practices. One example of how to use education is the use of refresher courses every three months for existing employees with over five years of experience which may be all that is required for continuing education. This however may not be appropriate for a new employee with less than six months of employment.

Understanding and using the Characteristics of MSDs: In regards to MSD injuries, four case characteristics are identified to further identify traits and patterns that may be used to develop prevention programs. These case characteristics were discussed prior and include: 1) identifying the nature, 2) part of the body affected, 3) event or exposure, and 4) source. These characteristics may be used in a job analysis to identify potential risk factors. By focusing on occupational injury characteristics that are known, we are better equipped to try and avoid them. Knowledge of the characteristics that lead

to injury can decrease the occurrence or reoccurrence of occupational injury by educating employees on proper ergonomics, and enforcing the use of safety measures and devices.

Risk/Hazard Identification:

An injury prevention program helps to reduce costs by identifying risks, and implementing an injury prevention program aimed to avoid those risks by applying interventions to educate, implement (ergonomics), and enforce prevention. Knowledge of the characteristics that lead to injury can decrease the occurrence or reoccurrence of occupational injury by educating employees on proper ergonomics, and enforcing the use of safety measures and devices. This is why injury prevention is emphasized by companies trying to reduce costs due to injury, and why insurance organizations step in and sell injury prevention as a viable option to reduce costs.

Injury prevention is increasingly recognized as an integral process reducing the number of injuries, costs associated with treatment, and insurance premiums for employers. Injury prevention has also been identified as a potential key component for increasing productivity by accounting for the physical and psychosocial demands of the worker. Utilizing education, environmental modifications (ergonomics), and enforcement to develop an encompassing program effectively targets the needs of the employee for engaging in safe work.

Physical Demands

Addressing the physical demands of work not only relays the importance of health and wellness to an employee, but places the responsibility of injury prevention on everyone in the work environment. By placing responsibility on everyone, the employer demands an active responsibility to use practices, and knowledge of injury prevention

throughout all areas of the work environment. A secondary benefit of this approach is that employees become educated at identifying, and taking an active role in preventing occupational injuries.

What are the required physical demands to engage in work? Again, a thorough functional job description should inform the employee of the required physical demands. The length of time spent sitting, and/or standing. What the employee will be required to lift, carry, and move. The tools that are required to complete a job. These all are factors that contribute to the physical demands of work. Injury statistics tell us how each of these factors contributes to the potential for injury. It is up to the injury prevention program to identify how to fit an employee to a job based on these physical demands using such tools such as FCE.

Cognitive/Psychosocial Demands

It is important to keep in mind the cognitive/psychosocial concerns associated with occupational injuries. Occupational injuries affect not only the workers participation in remaining productive at the workplace; daily activities that occur outside of the work environment are directly affected. Emotional stress is compounded by financial stress, and may lead to decreased self worth. Job dissatisfaction and increased stress with their employer place this group of workers at increased risk for recurring occupational injury, and can have negative results on overall morale which directly impacts productivity which is an employer's ultimate goal.

Cognitive demands associated with occupational injuries also increase the risk of occupational injury when compounded with both the psychosocial and physical demands.

Cognitive demands are dynamic, and require employees to take part in a wide variety of cognitive processing skills required to participate in a given task or job.

Physical and cognitive/psychosocial demands should be addressed as one.

Performance in one directly affects performance in the other. When the employee knows that their employer is concerned with their health and wellness, the employee feels important, and an essential part of the big picture. An employee who is physically capable to engage in occupation ensures that the risk for occupational injury is minimized. A healthy employee is a happy employee. This only accounts for one part of the injury prevention program. Productivity is also affected because the employee is cognitively aware of their environment, and of the potential risks within it. Psychosocial stressors contributing to increased risk of injury can be controlled with a comprehensive injury prevention program. What motivates the employee, how do habits contribute to their participation in occupation? This approach addresses the two components of the physical and psychosocial demands that contribute to occupational injuries; the human and environmental factors.

What does the employer gain by implementing an injury prevention program?

The bottom line is cost savings, and increased productivity. The occurrence of occupational injuries directly affects cost, and productivity. Increased productivity means better profit earnings. A decrease in occupational injuries also means money that would have been paid out for insurance premiums, and workers compensation costs can now be utilized to continue building injury prevention into all areas of production. Companies that have profited from implementing injury prevention programs have redirected the cost

savings into equipment that not only is ergonomically usable by all employees, but increasingly efficient for boosting productivity.

Identifying the source of occupational injuries is not always that easy. This is why selling the idea of injury prevention has remained to be a hard sell for many companies. While it may not be easy to identify the source of occupational injuries, identifying occupational injuries using statistical information about demographics, and the natures of injuries allows an injury prevention program to identify factors that contribute to the potential risk of injury. The cost of prevention for many employers is a fraction of the cost that it will incur post injury for many occupational injuries.

One example of a successful program is at the Frito Lay Corporation. The basic concepts of the program are as follows:

Frito Lay Corporation Case Study

The Frito Lay Corporation used a number of prevention programs to reduce occupational injuries. Their approach attained an 85% reduction in their Workers Compensation costs since 1990. (Buckner & Clark, 1998, p. 10) The program consisted of:

1. An implemented safety philosophy constitutes that all injuries can be prevented, everyone is responsible for preventing injuries, and training teammates to work safely is essential.
2. Safety prevention teams that have contributed to cost reduction through tracking injury trends.
3. Wellness programs that encourage fitness.

4. Ergonomic training to cover the basics of ergonomics and body mechanics, proper work methods, on-line exercise review, plant-wide back injury prevention, and manager injury prevention symposiums are offered annually.
5. In addition to training existing employees, new employees are additionally educated on avoidance of high risk activities, and early symptom reporting.
6. Another interesting component of their program pairs new employees with a buddy for their first two weeks, and restricts new employees from overtime for 6 weeks.

(Buckner & Clark, 1998, p. 10-15)

An 85% reduction is an impressive outcome to attain in reduced costs. The primary components of Frito Lays program is a combination of education, philosophy shift and orchestrated behavioral change. It is also of interest to point out that the program at Frito Lay was designed and implemented by an Occupational Therapist.

The Role of the Occupational Therapist

“Industrial settings are providing a host of new roles for OT practitioners. Long involved in the rehabilitation of workers compensation clients, OT practitioners have more recently gained a foothold as authorities in wellness and injury prevention” (Joe, 1997, p. 14). Occupational Therapists have the essential skills necessary for developing, and implementing an injury prevention program. With a strong background that combines biomechanical and behavioral components of human occupation with performance, occupational therapists are capable of designing, implementing and evaluating interventions to address the human and environmental factors that contribute to occupational injury.

“Today, industrial therapy services is one of the fastest growing areas of practice provided by occupational therapy practitioners. A wide spectrum of injury prevention (ability) and injury management (disability) services define the role of occupational therapy in industrial therapy” (Miller, 1998, p. 36). Within the field of Industrial Therapy, occupational therapy provides services that may include job analysis, functional capacity evaluations (FCEs), and education. Each of these areas will be discussed in more detail highlighting their importance to an effective prevention program.

Job Analysis

A job analysis is an essential step for providing information for employee placement, or functional capacity assessments. A job analysis is conducted before a FCE, and provides critical information that is used to determine the potential for risk when considering placement for an employee after completing a pre-employment functional capacity assessment. A job analysis can also be conducted on site to determine the risk for unsafe work practices. An Occupational Therapist utilizes this information to define the person environment interaction, and what can be done to avoid potential risk for injury.

A job analysis is also important for defining the requirements for engaging in a job. This information is included in a job description that defines the essential activities and tasks that an employee will be required to complete while engaging in a specific job. By ensuring that essential activities and tasks are defined, those who cannot meet the essential standards receive equal treatment in the hiring process.

The Americans with Disabilities Act (ADA) ensures equal treatment for individuals with disabilities and sets a standard for hiring practices across

the United States. Evaluations or assessments that focus on a disability or specific previous injury are barred, and decisions related to hiring must focus on self-limiting capabilities that affect actual job performance.

(Miller, 1998, p. 38)

This ensures that job performance is assessed and when reasonable accommodations cannot be met to perform that job, the employee may not be accepted for the job in accordance with the ADA. A job analysis is conducted on site to determine the risk for unsafe work practices. An Occupational Therapist utilizes this information to define the person environment interaction, and what can be done to avoid potential risk for injury.

Functional Capacity Evaluation

The Functional Capacity Evaluation serves a multitude of functions, by identifying physical abilities, and limitations of a prospective employee.

Functional capacity evaluations (FCEs) have become part of practice in work injury prevention and rehabilitation. These tools are supposed to define an individual's functional abilities or limitations in the context of safe, productive work tasks. Regulatory agencies such as the Occupational Safety and Health Administration are promoting the use of FCEs in an effort to ensure employee health and safety in job placement.

(King, et al, 1998, p. 852)

The value of the FCE is not just in its ability to define function, it can also be used to determine the effectiveness of an injury prevention program. The FCE can be used to establish a baseline and an outcome measure. When coupled with demographic and

injury characteristics, the FCE can determine critical differences in the delivery of an injury prevention program to employees. Identifying gaps in service delivery addresses the goal of a comprehensive injury prevention program by identifying the employee's needs. A primary area of need tend to be proper and consistent employee education.

Employee Education

Education is an ongoing process since the work environment is dynamic. The employee should never remain static in their knowledge for engaging in safe work procedures and practices. Education is an important tool for injury prevention as implementing a plan does not ensure an employee knows how or why it benefits them.

Education alone will most often fail. Screening alone will most often fail.

Ergonomic changes alone will most often fail. They must all be incorporated with one another and be present in a workplace where there is employer commitment to safety and worker commitment to work smart.

(Isernhagen, et al, 1997, p. 189)

Ergonomics

Ergonomics is concerned with creating a safe occupational environment by addressing the behavioral and biomechanical components of work. An injury prevention program utilizes ergonomics to help reduce the potential risk of injury by identifying designing, and implementing safe work practices based on the specific needs of each employee.

Ergonomics can be used to define factors that contribute to injury. Within the context of work, there are two contributing factors to occupational injury, the human and environmental factor, both can be analyzed to identify potential risk for injury. However,

designing and implementing an intervention for these two factors is ergonomics biggest contribution to injury prevention.

The human factor of ergonomics not only takes into consideration the biomechanical component of work, the behavioral component is also addressed. Behaviorally, ergonomics might address motivation, volition, and habituation which are all very dynamic, and will not present themselves in the same manner for every employee. Maturation, volition and habituation can have differing effects on an employee's production, or potential for injury. The behavioral component of ergonomics must be addressed because it identifies the employees' ability to adapt to the work environment safely.

Ergonomics is concerned with how the employee fits the work environment. Environmental modifications can be made to make the work environment safe, but ultimately the worker must fit the environment for them to remain free of injury. Ergonomics therefore is concerned with how the job is performed. This information can be used to fit the right person to the environment, or having the right tool for the job.

Injury prevention relies heavily on ergonomics due to the nature of the work environment. The environment is created to complete a work task or activity. The individual completing the task or activity is required to interact with this environment, and in order to remain productive must adapt to that environment. It is the goal of ergonomics to ensure that the worker and environment interaction is not a potential risk for injury.

Proposed Protocol

The proposed protocol will identify the tools required to design an injury prevention program process that focuses on evaluation, education, and behavioral change and modification. The protocol will utilize an occupational therapists role in industrial rehabilitation to provide injury prevention through use of available interventions. These interventions are used to implement a comprehensive injury prevention program, and are aimed to meet the needs of the employer. The details of the protocol are defined in Chapter IV. The main components of the Injury Prevention protocol are:

1. Assessments
2. Interventions
3. Education
4. Program Evaluation

Chapter Three

Activities/Methodology

A literature review was conducted to determine the economic impact of occupational injuries as well as the best practice methods for prevention and intervention of these costs. Based on this information, a protocol regarding injury prevention was developed by identifying primary injury types utilizing injury demographics and characteristics. Demographics, injury characteristics and contributing factors were identified through the literature review as necessary in the development of an injury prevention protocol, and utilized to highlight the need for injury prevention. Along with this information, ergonomics was addressed identifying behavioral and biomechanical components of occupational injury.

A review of literature identified the high costs associated with occupational injuries. These high costs were associated with increased workers' compensation premiums, and lost productivity. By identifying the possible concerns employers may have regarding occupational injuries due to the cost of doing business, information supporting the primary types of injuries was identified to highlight the high persistence of their occurrence, and costs associated with them.

Developing a protocol was completed by identifying the role of occupational therapy in injury prevention. Occupational therapies role was identified as educating, implementing environmental modifications (ergonomics), and enforcing injury

prevention. By identifying the role of occupational therapy in injury prevention, interventions were identified that could be utilized to assist in the development of the protocol.

The interventions identified were job analysis, and the functional capacity evaluation. Both are assessments that can be utilized in injury prevention, and utilize the skills and abilities of occupational therapy while addressing the biomechanical and behavioral aspects of occupational injury. This information was identified as complimentary to the use of knowledge regarding demographics, and injury statistics of occupational injuries.

The protocol offers occupational therapists a viable source of interventions utilizing a thorough review of literature that highlights information for someone who is interested in implementing injury prevention.

CHAPTER IV

PRODUCT

Injury Prevention Program Protocol

Designed by

Jeremy Anderson

2004-2005

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Introduction to Protocol

Description

This protocol is designed to be an instruction manual to provide information regarding injury prevention assessments and interventions in the development of an injury prevention program. The assessment section provides information regarding the components that can assist in identifying factors that contribute to occupational injury. The intervention section provides information to address occupational injury factors and outcomes to assist in the potential risk of occupational injury.

Organization of Protocol Manual

This protocol is organized in four sections; 1) assessments, 2) interventions, 3) education and 4) program evaluation. The assessment section introduces descriptions, processes, and outcomes of a Job Analysis, Functional Capacity Evaluation, and Ergonomic Assessment. The intervention section introduces descriptions, processes, and outcomes of Ergonomics, and Work Conditioning. The education section discusses the main components of education, as well as the principles of education. Finally, the fourth section, program evaluation, discusses how an injury prevention program can be evaluated as to its effectiveness and efficiency.

Assessment

Introduction to Assessment

Assessments are conducted to identify potential factors that may contribute to occupational injury. An assessment can be conducted initially, and as a follow-up, which can be utilized to measure the outcome of a program. Assessments can also be conducted at intervals that may coincide with changes in job requirements. The three that will be presented in this section are; Job Analysis, Functional Capacity Evaluation and Ergonomics.

Job Analysis

Description:

“A job analysis is a systematic evaluation of the job that identifies its physical, cognitive, social, and psychological requirements” (Trombly & Radomski, 2002, p. 721).

A job analysis can be utilized to describe essential functions, risk factors, match employees based on capabilities, and may be used to guide interventions for existing employees. Another reason for conducting a job analysis is to create a functional job description that outlines essential functions for placing new, existing, and returning employees.

When to Conduct a Job Analysis:

“Purposes of conducting a job analysis include returning a disabled person to work, identifying musculoskeletal risk factors, matching a rehabilitated or new worker with job demands, and developing assessments such as FCEs and preplacement screening tests” (Trombly & Radomski, 2002, p. 721). The Job Analysis is conducted prior to an FCE as it defines essential functions that are utilized to guide the process of an FCE.

Process:

1. Planning:

- a. Identify Purpose of Job Analysis

- b. Identify Needed Forms and Equipment
- c. Estimate Time for Job Analysis
- d. Obtain Approval

2. Initial Interview:

- a. Discuss Purpose of Job Analysis
- b. Review Job Description (Use DOT description as a guide)
- c. Complete Interview/Observation Forms
- d. Identify Essential Functions

3. Observation:

- a. Validate Initial Information
- b. Identify Physical Demands
- c. Identify Essential Functions

4. Exit Interview:

- a. Resolve Discrepancies
- b. Check Off Essential Functions

5. Data Analysis and Summary

- a. Analyze Data
- b. Complete Job Analysis Summary Form
- c. Write functional job description based on analysis

6. Complete Final Report

(Adapted from Occupation and Vocation, University of North Dakota Occupational Therapy Program, 2004)

Outcome:

A Job Analysis can be utilized to (Trombly & Radomski, 2002, p. 721):

- Match injured workers' capabilities to job task requirements
- Place workers on light duty
- Return previously injured workers to work
- Identify risk factors associated with work-related musculoskeletal disorders
- Develop preplacement, post job offer screenings
- Write job description (possibly using ADA terminology)
- Describe and advertise jobs

Functional Capacity Evaluation (FCE)

Description:

The FCE is used “to define an individual’s functional abilities or limitations in the context of safe, productive work tasks. A series of test activities is usually administered to measure whether an individual has the ability to meet the required job demands” (King, Tuckwell & Barrett, 1998, p. 852). “An FCE is a systematic process designed to assess a client’s physical capacities and functional abilities. Identification of an individual’s capabilities also reveals his or her limitations” (Trombly & Radomski, 2002, p. 721).

When to Conduct an FCE:

An FCE can be used “for preemployment and postoffer screenings and for determining a worker’s ability to resume his or her job duties” (Trombly & Radomski, 2002, p. 724).

Process:

Components of an FCE “begin with collecting a client’s medical, social, and vocational history. This information assists with determining a client’s perception of his or her own abilities” (King, et. al., 1998, p. 857). Vocational history information can be beneficial for new employee and assist with job placement based on past experiences. A

physical examination and physiological measurements are also utilized to establish a baseline functional level.

- Physical Examination

“The primary reason for performing a physical assessment is to identify clinical signs related to conditions that are contraindications for testing or that should be monitored closely during testing” (King, et. al, 1998, p. 857).

- Physiological Measurement

Measures include items such as muscular endurance and cardiovascular endurance. Muscular endurance is usually measured by describing the demands of the activity performed and the duration of muscle performance prior to fatigue. Submaximal protocols, which have predetermined termination points based on a percentage of the client’s estimated maximum heart rate, are a method of assessing cardiovascular endurance (King, et. al, 1998, p. 857).

To establish a baseline of functioning, a Physical Capacity Evaluation is performed. “The Physical Capacity Evaluation (PCE) assesses the physical and biomechanical aspects” (Neistadt & Crepeau, 1998, p. 209). This assessment objectively measures the following:

- Active Range of Motion
- Muscle Strength
- Posture
- Gait
- Volumetric measurements
- Sensation

- Cardiopulmonary status

Upon completion of a FCE, a job-specific evaluation is performed. “This means that specific work tasks are designed to simulate the critical tasks associated with a specific job or set of jobs” (Trombly & Radomski, 2002, p. 724). This process was described previously in the job analysis

Outcome:

The information gained from an FCE can be used to match the individual’s residual capacities with the demands of a specific job, as a basis for establishing work or work site modifications or accommodations, as evidence in the determination of disability or compensation status, and/or as a baseline for noting the physical capabilities of new employees. (Trombly & Radomski, 2002, p. 721)

Ergonomic Assessment

Description:

An Ergonomic Assessment can be conducted to identify how physical, mental, and environmental demands impact job performance in relationship to increased risk of occupational injury. This information is used in the intervention process to make changes that meet the needs of the employee based on the demands of the job. “The seven elements of an effective program comprise a seven-step “pathway” for evaluating and addressing musculoskeletal concerns in an individual workplace. The seven steps are as follows” (U.S. Department Of Commerce, 1997, p. vi).

1. Looking for signs of a potential musculoskeletal problem in the workplace, such as frequent worker reports of aches and pains, or job tasks that require repetitive, forceful exertion.
2. Showing management commitment in addressing possible problems and encouraging worker involvement in problem-solving activities.
3. Offering training to expand management and worker ability to evaluate potential musculoskeletal problems.
4. Gathering data to identify jobs or work conditions that are problematic, using sources such as injury and illness logs, medical records, and job analyses.

5. Identifying effective controls for tasks that pose a risk of musculoskeletal injury and evaluating these approaches once they have been instituted to see if they have reduced or eliminated the problem.
6. Establishing health care management to emphasize the importance of early detection and treatment of musculoskeletal disorder for preventing impairment and disability.
7. Minimizing risk factors for musculoskeletal disorders when planning new work processes and operations-it is less costly to build good design into the workplace than to redesign or retrofit later.

When to Conduct and Ergonomic Assessment:

Ergonomic assessments may be conducted when working with an injured worker determining ergonomic modifications that are required to allow successful completion of a job. An ergonomic assessment may also help to identify potential risk areas that will help to reduce the amount and frequency of occupational injuries. Finally, and ergonomic assessment can be conducted for an “attorney involved in Americans with Disabilities Act (ADA) cases may want assistance making workplace accommodations, which usually require an on-site analysis” (Aja, 1996, p. 37).

Process:

1. Job Information/Current Problems

- a. Main job duties (use a current job description)
- b. Current Problems/symptoms if any
- c. Treatment received for any symptoms up to now
- d. Workers Compensation Case

- e. ADA Request
- f. Hand exerciser available at workstation
- g. Hand dominance

2. Workstation/Machines/Tools/Equipment Used

- a. Layout design
- b. Primary Station
- c. Secondary Station
- d. Duties performed away from either of the above?
- e. Category of computer use
- f. Seating Criteria
- g. Video display Unit and Keyboard Issues

3. Physical Demands

- a. Workstation Layout
- b. Can work be performed without repetition?
- c. Postures maintained, changing positions, alternating activities, awkward positions
- d. Work Conditions

4. Environmental Demands

- a. Foot Rest/Floor Mat
- b. Temperature
- c. Vibration
- d. Auditory
- e. Privacy and Sound

- f. Humidity
- g. Lighting
- h. Potential and existing hazards

5. Mental Demands (Cognitive demands that the job requires for successful completion)

6. Psychological Demands (Psychological demands that the job requires in order for successful completion)

7. Employee Training

- a. Prior Training
- b. Learning needs
- c. Educational materials/information shared
- d. Where changes made at this time

8. Possible Modifications

- a. Areas needing further analysis
- b. Recommendations
- c. Options and costs
- d. Ergonomic examples

(Adapted from Occupation and Vocation, University of North Dakota Occupational Therapy Program, 2004)

Outcome:

The outcome of conducting an ergonomic assessment is to decrease potential risk factors associated with poor ergonomics thereby creating a safe productive work

environment. An ergonomic assessment may also identify interventions that can be utilized to address those risk factors that contribute to occupational injury.

Intervention

Introduction to Intervention

Interventions are utilized to address the person, context, and task interaction. The interventions that are discussed here utilize the therapeutic intervention strategies of establish restore, and modify (adapt). The establish restore intervention strategy is addressed utilizing work conditioning, and the modify (adapt) intervention strategy is addressed utilizing ergonomics.

One intervention option is to establish or restore a person's skills or abilities. The establish intervention leads toward the attainment of a new skill or ability. The restore option leads toward the reestablishment of a lost skill or ability. Establish and restore interventions target the person; the outcome is a new or renewed skill or ability. This intervention fixes or improves the person, so that performance is improved. (Neistadt & Crepeau, 1998, p. 533)

The modify (adapt) intervention strategy "finds ways to revise the current context or task demands to support performance in the natural setting" (Neistadt & Crepeau, 1998, p. 533).

The goal of both intervention strategies is to address the human environment interaction, and reduce the risk factors that contribute to occupational injury.

Ergonomics

Description:

Ergonomics as an intervention is concerned with the interactions of humans and their environment.

A large number of factors play a role in ergonomics; these include body posture and movement (sitting, standing, lifting, pulling and pushing), environmental factors (noise, vibration, illumination, climate, chemical substances), information and operation (information gained visually or through other senses, controls, relation between displays and control), as well as work organization (appropriate tasks, interesting jobs). These factors determine to a large extent safety, health, comfort and efficient performance at work and in everyday life. (Dul & Weerdmeester, 2001, p. 2)

Process:

The *ergonomic assessment* identifies potential risks and can “identify tasks or work areas which require further hazard analysis and controls. This process is also used to identify low risk and light duty jobs” (Key, 1995, p. 82). After an ergonomic assessment has been completed, “hazard prevention and controls consisting of one or more of the following; engineering controls, workpractice controls, and administrative controls” are identified as possible elements to minimize potential risk. Finally, “training

and education throughout all levels of the organization, is crucial to success” (Key, 1995, p. 83).

- Engineering controls are used to minimize or eliminate the hazard all together by physically altering the work area.
- Workpractice controls are safe practices that are understood and followed by managers, supervisors, and employees alike.
- Administrative controls focus on reducing employee exposure to known hazards (i.e. job rotation, breaks, and severity of exposure).

(Key, 1995, p. 82-83)

Training and education is an important piece of an ergonomic intervention.

Training and education should be both general and specific. Specific training is provided “for all new or reassigned employees. This type of initial orientation training is useful in teaching employees other job specific methods and concepts, which often compliments ergonomic training” (Key, 1995, p. 83).

The general training should familiarize the employee with the nature of CTDs, the risk factors that may contribute to them, how to recognize and report such factors, any symptoms they may experience, and the steps each can take to prevent disorders. (Key, 1995, p. 83)

General training can also include some basics of proper body posture and movement. This can be used as a foundation of information that further training and education can be built from.

Body posture and movement are the two components of an injury prevention intervention program that have been shown to have the greatest impact in regards to cost

and productivity. They are each addressed independently, but it should be noted that the impact they have on each other is a compounding factor on the increased risk of occupational injury. The component of movement is compounded by a number of factors such as force. Awkward movements are potential risk factors for occupational injury. When you combine improper movements with force and repetition, it is important to keep the following information in mind.

Posture constantly changes depending on the activity; but no matter what you are doing, there is a way of holding and moving your body that is balanced and efficient. Good posture means that fatigue is reduced and muscles work efficiently. The following information is important to utilize to ensure proper posture:

1. Stand Tall

The knees should be straight but not locked, stomach flat, ribs raised, shoulders and head erect. Pretend you are balancing a book on your head. Your weight should be evenly distributed on both legs.

2. Walk Tall

Walk tall with your feet pointing straight ahead. Your arms should swing freely from your sides. Look straight ahead; never down.

3. Sit Tall

Sit tall with both feet flat on the floor, your whole back against the chair back, and your head erect. Your weight should be evenly distributed on both buttocks.

Outcome:

An effective ergonomic intervention is “reflected in increased productivity and quality. Employee safety, health, and comfort are also increased” (Key, 1995, p. 83).

Work Conditioning

Description:

Work conditioning is an intervention "program focused on functional requirements of a job or employment setting; incorporates basic physical conditioning such as restoration of flexibility, strength, coordination, and endurance" (Trombly & Radomski, 2002, p. 716).

Process:

Work Conditioning utilizes activities that "involve or simulate job requirements, but in a controlled environment which can be observed, modified, corrected, and reinforce" (Key, 1995, p. 13). A Work Conditioning program utilizes repetitive activities, and graded weights of those required by a specific task. "*Interim Assessments* are used to objectively monitor progress in the program" (Key, 1995, p. 273). Information obtained from an FCE can be used to compare progress with baseline function. "*Exit Assessments* are performed at the conclusion of the Work Conditioning" program (Key, 1995, p. 273). It is expected that this information will be similar to the baseline functional level reported in the FCE.

The components of a Work Conditioning intervention utilize the following:

- Flexibility and Mobility

"The purpose of these activities is to improve the client's postural adaptability for performance of functional and work related tasks" (Key, 1995, p. 274).

- Strengthening

“The selection of the exercises is based on the results of the Functional Capacity Assessment, the job requirements, and the specific body part that is injured (Key, 1995, p. 274)”

- Job Simulation

“The purpose of the job simulation component is to build capabilities of all musculoskeletal body parts and postures involved in the dynamic functions of the job” (Key, 1995, p. 280).

Outcome:

Work conditioning is utilized to (Key, 1995, p. 271):

- Restore dynamic function to the highest achievable levels.
- Address the needs of the whole person-the psychosocial needs as well as the physiological.
- Organize treatment professionals and other stakeholders and participants into a team which includes the client as the center of the team’s focus.
- Involve the client in understanding the current needs, goal setting, planning, monitoring progress, and making adjustments as progress proceeds.

Education

Training and Education

Description:

“Education programs are valuable for personal health, job performance, and long term employment security” (Key, 1995, p. 283). It is essential for employees to understand basic mechanics, knowledge of injury contribution, and how to safely perform a job. “Whatever the individual needs, the overall objective is to perform jobs comfortably, and to prevent reinjury” (Key, 1995, p. 283).

Components:

“Although the range of education topics is dependent upon the market being served, some topics are felt to be important for safe job performance and functional independence regardless of the category of workers involved” (Key, 1995, p. 283)

Training and education is not as much concerned with the information, but how the information is delivered, or its methodology. An environment that is conducive to learning is essential with the environment serving as the primary influence on behavior, and the learning process. Training is important, but it is only a part of the prevention process, and not the process itself.

Training and education is used to communicating the information, and is dependent on variables to ensure a successful prevention program” (Keys, 1995, p. 83; Melnick, 2000, p. 6)

- Communication: Delivering information one time per year in a four hour class is not nearly as effective as repeating it hundreds or thousands of times throughout the year in brief messages.

- Accountability: Identify the accountability of everyone involved at the beginning of each training session. The presenter, audience, and management.
- Inclusion: The presenter, audience, and management are all members of the same group. Everyone is responsible for the knowledge, and should be able to replicate it in the forms of surveys, and orientations.
- Flexibility: In presenting materials, issues that may arise such as uninvolved audiences, time limitations, and tough questions can be resolved with a proactive rapport, and the establishment of credibility to ensure that the training and education process is of the highest quality.
- Fun: Serious information should be presented in an inviting environment that is conducive to learning, and this is best established when the learning process is fun. This could include warm-up activities, or participant involvement, anything to make it a fun process.

(Melnik, 2000, p.6)

Process:

“The components of an educational program can be divided into primary and secondary topics” (Key, 1995, p. 343).

- “Primary topics are the most important and of greatest need to all participants” (Key, 1995, p. 343).
- “Secondary topics have value for everyone, but are more relevant to some of the participants” (Key, 1995, p. 343).

Training and education is implemented based on the primary or secondary topics for employees based on the potential risk in an environment, or a given task. Keeping in

mind the components of training and education, the frequency of training and education can be calculated based on injury occurrence, and environments and tasks that are considered high risk potential for injury.

Outcome:

A training and education program is concerned with creating a process that is responsible for communicating the responsibility for safe, self-responsible injury prevention. A training and education program applies the principles of commitment, communication, accountability, respect, flexibility, consistency, and inclusion to ensure injury prevention is successful.

Program Evaluation

Evaluation

Description:

The overall goal of injury prevention is to reduce workplace injury, and to identify potential risks within an environment, or task. Evaluating an injury prevention program is essential to qualify the effectiveness of the program. Evaluation can highlight information such as the number of days free from injury, and decreased costs associated with treatment and care of occupational injury.

Process:

The frequency and number of occupational injuries is an easy and effective manner of tracking a prevention program. This can be accomplished with the least amount of time and effort as employers are required to log all occupational injuries. This may be completed by reviewing the Occupational Safety and Health Administration (OSHA) 300 logs. The OSHA 300 logs list all work related injuries, and can be an effective means for tracking injury characteristics, and employee demographics that may contribute to occupational injury.

Tracking work related injuries will give an overall view of the decrease in occupational injury. This information can also be indicative of reduced cost related to insurance premiums. Cost reduction of course has been identified as a factor why companies adopt injury prevention.

Finally, employee surveys can track the effectiveness of an injury prevention program. Surveys can highlight the effectiveness of ergonomics, work conditioning, and training and education on injury prevention.

Outcome:

The expected outcome of evaluating an injury prevention program is the continued acceptance and practice of the assessments and interventions that are practiced within an injury prevention program by highlighting the decrease of injury and cost.

CHAPTER V

SUMMARY

The literature review has identified the negative fiscal effects that occupational injuries, both direct and indirect, have for employers. Injury demographics and characteristics continue to highlight the need for injury prevention, and have been identified as tools for addressing the occurrence of occupational injuries. The components of a comprehensive injury prevention program have been shown to be effective in reducing both the negative fiscal effects, and the frequent occurrence of injuries. Injury prevention combines areas of knowledge based on both the physical and cognitive/psychosocial components that contribute to occupational injury. Occupational therapy has been identified as a major player in the development, and implementation of such a program.

Occupational therapists provide the essential skills and tools required to provide a comprehensive injury prevention program based on physical and cognitive/psychosocial components of occupational injuries. Furthermore, occupational therapy can provide employers with the best means to address the increasing concerns of, specifically the costs associated with occupational injury.

The protocol developed for this scholarly project was designed with the skills and knowledge of occupational therapists in mind. The assessments, interventions, education, and program evaluation components are not specific to an employer, however are best

utilized by an occupational therapist to ensure that the injury prevention program addresses all the components that are attributable to occupational injury.

A limitation to this scholarly project was the lack of research that has been conducted regarding how productivity is affected regarding decreased occupational injury. It is assumed that productivity will be directly affected by a decrease in the amount and occurrence of occupational injuries, however there is not enough research to provide evidence supporting this assumption. Along with the negative fiscal impact of occupational injury, the effect of productivity would be a strong influencing factor in regards to employers needs to incorporate injury prevention.

Further research is recommended regarding the choice of assessments, interventions, education, and program evaluation components to validate the content of the protocol within this scholarly project. By validating the components of the protocol within this scholarly project, it is believed that the position occupational therapists hold in the practice of Industrial Therapy will continue to grow, and create a demand for our specialized services.

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